

A  
PROBATIONARY ESSAY

ON

ANEURISM:

SUBMITTED,

BY THE AUTHORITY OF THE PRESIDENT  
AND HIS COUNCIL,

TO THE

EXAMINATION OF THE

Royal College of Surgeons of Edinburgh,

WHEN CANDIDATE

FOR

ADMISSION INTO THEIR BODY,

*IN CONFORMITY TO THEIR REGULATIONS*

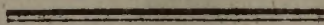
RESPECTING

*The Admission of Ordinary Fellows.*

BY

ALEXANDER MACAULAY, M. D.

MEMBER OF THE ROYAL COLLEGE OF SURGEONS IN LONDON.



EDINBURGH:

PRINTED BY J. & C. MUIRHEAD.

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1820.



THE UNIVERSITY OF EDINBURGH

ALMA MATER

OF THE UNIVERSITY OF EDINBURGH

AND THE CITY

OF EDINBURGH

THE UNIVERSITY OF EDINBURGH

ALMA MATER

1850

ADMISSION INTO THE BODY

IN CONNECTION WITH THE

UNIVERSITY

OF EDINBURGH

BY

ALMA MATER

MEMBER OF THE BODY

EDINBURGH

PRINTED BY J. & J. CLARK

1850

TO  
GEORGE KELLIE, M. D.

FELLOW OF THE ROYAL COLLEGE OF SURGEONS  
OF EDINBURGH,

THIS ESSAY

IS RESPECTFULLY AND AFFECTIONATELY

INSCRIBED BY

THE AUTHOR.



TO

GEORGE KELLIE, M.D.

FELLOW OF THE ROYAL COLLEGE OF MEDICINS

OF EDINBURGH

THIS ESSAY

IS RESPECTFULLY AND AFFECTIONATELY

DEDICATED BY

THE AUTHOR



## ESSAY

ON

## A NEURISM.

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**T**HE treatment of Aneurism, in the present day, is the noblest triumph of the skill and boldness of Modern Surgery. Even after POTT had practised for forty years, he thought amputation of the thigh the only remedy for aneurism in the ham; and a person cured of that disease, was shewn to medical men as a curiosity: to put a ligature on the carotid artery was considered as equivalent to fatal compression of the brain; and a proposal to obliterate the iliac artery would have been heard with equal disregard, as the boast of a specific for cancer, or the discovery of the grand elixir.



While we pay the just tribute of applause to the courage and the science of those who proposed and executed such operations with success, it is impossible to reflect, without the highest admiration, on the resources of the animal economy of which they availed themselves. Much as had been said of the preserving and restoring powers of Nature, physiologists were far from imagining that life and sensation would continue in the foot after the large artery of the thigh was obliterated; that the cutting off one-fourth of its supply of blood would inflict but little injury on the brain; and that tumours which had increased, or continued for years, would disappear in a few weeks, by the surprising activity of the absorbent system.

In the present Essay, I propose to give a short statement of the present approved doctrines concerning aneurism, with an account of some of the operations for its cure, when occurring in arteries that are within the reach of the surgeon. There are some affections analogous to aneurism, viz. the aneurismal varix, and the aneurism by anastomosis; but into the consideration of these, the limits of this Essay forbid me to enter.



## SYMPTOMS OF ANEURISM.

THIS term is employed to denote a tumour, more or less circumscribed, occurring in the course of an artery. It is generally small at first, but gradually increases; has a pulsatory motion corresponding with the beats of the other arteries of the system; it disappears by pressure; but when it has attained considerable size, the two last mentioned characters are obscure or lost. Sometimes, when situated near joints or other parts of the extremities, it causes swelling or torpor of the limb, and by its pressure on the neighbouring parts it may displace them, and cause a caries or absorption of the bone. The integuments are generally unchanged in their appearance, unless when the tumour is about to burst externally, as sometimes happens when nothing has been attempted for its removal or cure.

## PATHOLOGY OR PROXIMATE CAUSE OF ANEURISM.

ANEURISMS are generally described in books of surgery as being of two kinds; the first proceeding from a dilatation of the coats of an



artery through the whole circumference of its tube, which is denominated the *true* aneurism; the second kind proceeding from a wounded artery pouring out blood into the surrounding parts, which is termed the *false* aneurism. Those two forms of the disease are again characterised by the epithets, *circumscribed* or *diffuse*, according to the size and position of the tumour.

Such was the description of the kinds of aneurism almost universally adopted, till the celebrated SCARPA, with force of reasoning and accuracy of anatomical investigation, worthy of the pupil of MORGAGNI, established a more correct pathology of the disease.

The Italian anatomist maintains, that the earlier writers on the subject speak of nothing else but aneurisms by effusion; and he ascribes to FERNELIUS the introduction of an error, which, in spite of the confutations of BARBETTE, DIEMERBROEK, and others, has continued till very lately. He says, that the theory of FERNELIUS was not deduced from observation on the dead subject, but was merely the result of his own imagination, and a hypothesis drawn from the false conjecture, that effused arterial blood would be immedi-



ately converted into a putrid mass whenever the aneurismal sac was not formed by the proper coats of the artery; and that the arterial blood would never form a pulsating tumour when the tumour was not circumscribed, and formed by the proper coats of the dilated artery.

Notwithstanding the fact so frequently falling under the notice of surgeons, of blood effused from a punctured artery into the cellular substance, forming a tumour at once circumscribed, pulsating, and free from putrefaction, this theory of FERNELIUS supplanted the correct observations of the Greek and Arabian physicians, and was adopted with few exceptions by the greater number of anatomical writers. SENNERTUS, however, was of a different opinion, and believed that the proximate cause of aneurism consisted not in the dilatation, but the rupture of the internal proper coats, of the arteries, while the external coat remains entire; and that this external cellular coat, elevated and distended by the extravasated blood, ultimately forms the aneurismal sac. Such he conceived to be the nature of aneurism, even when formed by the puncture of a lancet at the bend of the arm; for though



both the coats of the artery are cut, the external one heals, while the internal, being more dense and brittle, does not heal, but suffers the blood to escape, and to distend the cellular sheath. HILDANUS was the first to state distinctly, that such was the cause of aneurism from puncture; and SENNERTUS extended the observation, by attributing all aneurisms, the internal and spontaneous, as well as the external and those produced by evident violence, to the same proximate cause, viz. a rupture or separation of the internal coats, while the cellular coat remains entire, but dilated. SENNERTUS is accordingly styled by Mr. ALLAN BURNS, the parent of our pathology of this disease. SCARPA agrees entirely with those two illustrious physicians, and thinks them the only two who, with regard to that point, have come at all near to the truth; and he thinks that his own repeated investigations authorize him to assert, that HILDANUS and SENNERTUS had only a short step to make to give to their theory concerning the proximate cause of aneurism all that degree of demonstration and proof of which the subject is susceptible. This short step SCARPA considers himself to have made; and has confessed-



ly done it in such a masterly manner, that he has left very little to be done by any succeeding writer on the pathology of aneurism.\*

The Italian Professor first determines the relations of the proper coats of the artery with its external cellular covering. This covering he considers as by no means one of the component coats of an artery, but merely a sheath, which it borrows or receives in common with the parts in whose vicinity it runs. By means of this sheath it is kept in its place, and connected to the parts surrounding it. This sheath has various degrees of density or firmness in different parts of the body. In addition to this cellular covering, which is common to all arteries, the arch and the thoracic portion of the aorta have two-thirds of the circumference covered by the pleura; and the abdominal portion is in like manner covered by the peritoneum.

If air, or any other fluid, be injected between the cellular covering and the muscular coat of the aorta, the cellular membrane, without having its cells destroyed, but only

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\* ALLAN BURNS' Observations on Diseases of the Heart, &c.



filled and distended, is elevated into a tumour. If the injected matter be capable of coagulating, and be pushed with much force, the cellular sheath of the artery is not only raised over it like a tumour, but the internal cells of that covering are also lacerated; and on examining the capsule of the artificial tumour, it appears as if it were formed of several layers, rough and irregular internally, smooth and polished externally. If air, or any liquid substance capable of coagulating, be pushed *within* the artery with such force that the proper or internal and muscular coats burst at some point of their circumference, the cellular sheath of the artery, in this, as in the first experiment, is raised like a tumour or aneurism. That the thin external covering of an artery should resist a force by which the dense muscular coat is ruptured, is owing to the brittleness and small degree of cohesion of that coat, while the laminæ of the cellular sheath being intermixed, reticulated, and connected closely together, yield gradually to the impelling fluid, and are thus capable of supporting great distension without being torn or ruptured.



“ The phenomena (says SCARPA) which are  
 “ observable in the artificial distensions of the  
 “ thoracic or abdominal aorta, present them-  
 “ selves likewise, in my opinion, in the case of  
 “ a morbid degeneration of the internal coat  
 “ of the artery, during which that coat be-  
 “ comes in some places weak, or very rigid  
 “ and friable, and is thinned, separated, or  
 “ ruptured, by the repeated jets of blood thrown  
 “ from the heart. The internal coat of an  
 “ artery being ulcerated or lacerated from a  
 “ slow internal cause in some point of its cir-  
 “ cumference, the blood impelled by the heart  
 “ begins immediately to ooze through the con-  
 “ nections of the fibres of the muscular coat,  
 “ and gradually to be effused into the inter-  
 “ stices of the cellular covering, which supplies  
 “ the place of a sheath to the injured artery,  
 “ and forms, for a certain space, a kind of ec-  
 “ chymosis, or extravasation of blood, slightly  
 “ elevated upon the artery. Afterwards, the  
 “ points of contact between the edges of the  
 “ fibres of the muscular coat being insensibly  
 “ separated, the arterial blood, penetrating be-  
 “ tween them, fills and elevates, in a remarkable  
 “ manner, the cellular covering of the artery,  
 “ and raises it after the manner of an incipient



“ tumour. Thus, the fibres and layers of the  
 “ muscular coat being wasted or lacerated, or  
 “ simply separated from each other, the arter-  
 “ ial blood is carried with greater force, and  
 “ in a greater quantity than before, into the  
 “ cellular sheath of the artery, which it forces  
 “ more outwards. Finally, the divisions be-  
 “ tween the interstices of the cellular coat  
 “ being ruptured, it is converted into a  
 “ sac, which is filled with polypous con-  
 “ cretions, and with fluid blood, and at last  
 “ forms, properly speaking, the aneurismal  
 “ sac; the internal texture of which, although  
 “ apparently composed of membranes placed  
 “ one over the other, is in fact very different  
 “ from that of the proper coats of the artery;  
 “ notwithstanding the injured artery both in  
 “ the thorax and in the abdomen, as well as  
 “ the aneurismal sac, is covered externally,  
 “ and inclosed within a common smooth mem-  
 “ brane.”\*

The same accurate anatomist declares, that  
 in the very considerable number of aneurisms  
 of the arch and of the thoracic and abdomi-

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\* Wishart's Translation of Scarpa on Aneurism, page  
 74, Edit. 1819.



nal trunk of the aorta which he had the opportunity of examining, he had not found a single one in which the rupture of the proper coats of the artery was not evident; and, consequently, the aneurismal sac was produced by a substance completely different from the internal or muscular coat of the injured artery. He found that the ruptured part of the artery formed a neck or isthmus constricting the aneurism, which dilated into a *fundus* beyond it; and dissecting from the opposite side of the vessel, he demonstrated the ragged fibrous edges of the torn muscular coat.

There being nothing to prevent the natural tendency of the effused blood to coagulate, successive layers of fibrine are deposited on the inner surface of the sac, by which its sides are much thickened.

Mr. ALLAN BURNS, in his excellent work on the Diseases of the Heart, published not long before his death, while he admits that SCARPA'S facts are well established, and that his deductions are fair inferences from his data, yet qualifies in some degree the conclusions which he has with such confidence drawn. SCARPA considers the cellular coat to be in a healthy state, and merely to undergo dis-



tension when it forms the aneurismal sac; BURNS thinks that its texture suffers a change, and becomes denser and thicker than natural; and that previous to the rupture of the internal coats, the external one has, all round the diseased part of the proper coats of the vessel, been fixed to the healthy parts more firmly than usual. Had this adhesion of the outer to the inner coats not taken place, (says Mr. BURNS,) how could the tumour have been raised from the side of the vessel like a large wart from the finger? Would not the blood, had this attachment been wanting, have forced its way along the tract of the vessel, detaching the coats from each other to an unbounded extent, as we see happen in our injections after death?

SCARPA insists that the aneurismal sac is never formed by a dilatation of the proper coats of the artery, but, with BURNS, he allows the possibility of the occurrence of morbid dilatation of an artery, with or without aneurism.

The rupture of the internal and muscular coat having been proved almost universally to occur in aneurism of the aorta, it is next to be inquired what are the causes of this rupture.



By far the most general cause, is a gradual morbid alteration in the structure of the vessel; such as ossification, ulceration, or steatomatous thickening of the inner coats; if this continues, spots are eroded, or the vessel is so weakened as to be unable to resist the impetus of the blood, and far less any unusually violent motion of the body. The blood, therefore, is poured out into the cellular sheath; and if the aneurism forms slowly, there are evident and distinct polypous layers, but if it has formed quickly, it appears to contain a grumous coagulated mass.

Aneurism of the aorta, which occurs the most frequently of any, being therefore produced by the rupture of the internal, and the circumscribing of the cellular coat, and seldom, if ever, being a dilatation of the whole of the coats of the vessel, the same investigation into aneurisms of the secondary arteries of the body, as the femoral, the popliteal, the carotid, the humeral, leads to the adoption of a similar pathology with respect to them. There is hardly one instance of a *true*, that is, a dilated aneurism, to be found on record; but numbers had been produced, in consequence either of a rupture of the artery, occasioned by vio-



lent exertion, or from a steatomatous degeneration of their proper coats, or an ulceration and erosion of those coats. The same explanation of aneurism is obvious, when it has been produced by puncturing the brachial artery in venesection, or when the humeral or axillary artery has been wounded by a cutting instrument. Here the integuments and fascia healing more quickly than the wounds in the coats of the artery, the blood not having egress, forms an ecchymosis; and continuing to be poured out, condenses the cellular membrane, and forms it into an aneurismal sac.

The same explanation is applicable to the aneurisms which occur in any artery whatever; they are uniformly produced by a rupture, or wound, or ulceration of the proper coats of the artery, and form a tumour, more or less diffused, according to the density of the cellular sheath, or the firmness of the previous adhesions, consequent on the diseased action which had gone on within the tube. The most accurate dissections have shewn, that what is called the true aneurism rarely exists; and even the plates and dissections of those who believe most firmly in dilatation, are considered by

SCARPA as proving an event directly the reverse.

### CURE OF ANEURISM.

WHEN we consider the powerful and incessant action of the arteries, it must appear very unlikely that a rupture, puncture, or ulceration of their coats will heal, or that the aneurism will ever spontaneously lessen or disappear. Nature, however, sometimes effects the cure of aneurism, in the following manner: A clot is formed, which closes the laceration or wound of the artery; and this clot applied to the lips of the opening, maintains the artery in a pervious state, and offers sufficient resistance to the flow of the arterial blood, to prevent any farther influx of it into the sac.

Such spontaneous cures of aneurism by the formation of a clot have occasionally happened; but even when this clot appears the firmest, when its apex is impacted into the wound, and tolerably hard layers, appear behind; there is always a weakness and insecurity, (as we see in the callus of a fractured bone, or the seared skin over an extensive burn,) that renders dangerous a blow or exertion which a



sound part might have undergone with impunity.

No cure of aneurism can be radical and permanent, unless the tube of the artery be obliterated, and converted into an impervious ligamentous substance for some space on both sides of the injury. This obliteration takes place from the adhesion of the sides of the artery to each other; and that this is the case in aneurisms which have been radically cured by nature or by art, is evident from numerous dissections.

The means employed to induce this adhesion of the sides of the vessel, when an operation is not had recourse to, is compression accurately employed, accompanied by occasional evacuations, rest, and a spare diet. Compression, to be effectual, must bring the two sides of the artery into contact; and impart such a degree of irritation as is sufficient to excite the adhesive inflammation. For this purpose, it is also necessary that the coats of the artery should be in some measure, at least, in a healthy state; otherwise, a certain degree of irritation might excite the suppurative or ulcerative, or absorbing process, and give rise to more solution of continuity in the vessel. It

is hardly necessary to mention, that pressure must be injurious, if it is not made nearer the heart than the injury in the vessel. Compression ought not to be applied when the aneurismal tumour is very large or very sensible; nor should it be used when the situation of the tumour is such as to interpose many soft parts between the pressure and the bone. It is evident, also, that compression will probably be ineffectual when there is a tendency in the arteries to brittleness, or steatomatous alteration of structure. From the little experience I have had of this subject, I should seldom be inclined to lose much time in attempting the closure of a wounded artery by compression.

The most certain and effectual means of obliterating the canal of an artery, is by the application of a ligature; the effects of which, are the following: The internal and middle coats of the artery are cut through, and the wounded surfaces brought together; a coagulum of blood commonly forms just within the artery; inflammation is excited on its internal and middle coats, by having cut them through, and lymph is effused, by which the wounded surfaces are united, and the canal rendered



impervious. Inflammation is at the same time excited on the corresponding external surface of the artery, in consequence of which it becomes very much thickened, and the surrounding parts also pour out lymph which covers the artery.

The same healthy state of the vessels, and susceptibility of inflammation, are necessary to insure the success of the ligature, as of compression; and hence aneurisms from a wound generally occurring in healthy vessels, are cured with more certainty than those occurring slowly and spontaneously from diseased blood vessels.

The *vis a tergo* being unable to overcome the obstruction to the usual course of the blood, caused by the ligature and its effects, it is now impelled with greater force into the lateral vessels, and distends them to such a degree as to convey life and nourishment in sufficient quantity to the limb or other organ requiring it. It is unnecessary to mention the numerous proofs of this, both from successful cures of aneurism, and from the ease with which aneurismatic limbs are injected.

The probability of success in the radical cure of aneurism, will depend on a variety

of circumstances, as the age and health of the patient, the longer or shorter duration of the disease, the injury already done to the surrounding parts, whether the bones are affected with caries or not, whether the diseased structure of the arteries is general over the system, or limited to one or a few vessels. Attention must be paid to moderate the circulation in the robust and plethoric, by bleeding, purging, and spare diet; and in those of a debilitated constitution, the health must be improved by bark and wine, a generous regimen, and the usual remedies for debility.

#### INTERNAL ANEURISMS.

THE diagnosis of these is very difficult, as many of the symptoms that occur may be owing to other causes. Aneurisms of the aorta are accompanied by uneasiness in the chest, irregular action of the heart, dyspnœa increased by exercise, cough, syncope, and when the œsophagus is pressed upon by the tumour, difficult or obstructed deglutition. The fatal termination of this affection is generally by the bursting of the sac externally, or



into the cavities or canals; sometimes by the effects of pressure on the surrounding parts.

Little can be done beyond palliating symptoms. The patient must use a light and spare diet, avoid fatigue, and all heating liquors; keep the bowels open; and if plethoric, occasional small bleedings may be employed.

#### EXTERNAL ANEURISMS.

ONE of the most frequent situations in which aneurism occurs is in the popliteal artery; and it was for the cure of the disease in this vessel, that the great modern improvements were suggested. Compression can hardly ever be trusted, and an operation must in general be had recourse to. It was formerly the practice to lay open the aneurismal sac, and attempt to tie the artery above and below the tumour; but so uniformly unfavourable was the result, that amputation of the thigh was considered as giving the patient a better chance of life than this operation did. The hazard of it arose from the depth of the popliteal artery, the difficulty of avoiding the anastomosing branches of the knee joint; from the

diseased portion of the vessel being sometimes covered by the adductor muscle of the thigh, at other times lying below the heads of the gastrocnemii and solei; and from unexpected adhesions of the vessel to the neighbouring parts. The injury too which was often done to the veins, the nerves, and periosteum, and the extensive ulceration in the cavity of the ham, united to render the cure of the disease, by the opening of the sac, an attempt nearly hopeless.

The honour of proposing a more easy and successful mode of treatment is generally ascribed to Mr. JOHN HUNTER. An operation, on principles quite similar to Mr. HUNTER's, was performed with success by ANEL many years before, who, for an aneurism at the bend of the arm, laid bare the brachial artery above the seat of the aneurism, separated it for a certain space from the cellular substance, and applied two contiguous ligatures on the vessel. By this means, the pulsation in the tumour ceased, and it dispersed without any incision made into it.

It has been said, that Mr. HUNTER not being one who pried into old works, his innovations claim all the honour due to the strictest originality; and that in trying the



new mode of cure for the popliteal aneurism, he had no other guide than his own sublime genius. By being ignorant ourselves of what has been done and written before us, and by addressing our suggestions to those who are equally so, much reputation for invention and original genius may be obtained ; but in surgery, as in every other art or science, its professors should be well acquainted with the discoveries of those who have gone before them, that they may not waste their time in inquiries after remedies which have already rewarded those who sought them. Whatever may be thought of the injudicious commendations of his admirers, to Mr. HUNTER belongs the praise of reviving, and explaining on scientific principles, an operation of little pain and danger, by which a disease is now easily cured, that the best surgeons of former days could not combat but with acute suffering and distressful mutilation.

The operation introduced by Mr. HUNTER consisted in obliterating the canal of the artery at a distance from the ham, trusting to the enlargement of the collateral and anastomosing vessels for the supply of the limb, and to the powers of the absorbent system to carry off the contents of the tumour, which he

left untouched. Immediately after the performance of the operation, the pulsation of the tumour in the ham ceases, the aneurism becomes smaller and less tense, and the articular arteries beat strongly. The temperature of the leg and foot of the operated side is for some hours lower than in the other side; but by the application of warm flannel, or gentle friction, the heat is soon restored, for the most part becomes greater; and ultimately the patient recovers the use of his leg as before his illness.

The best situation for taking up the femoral artery, is at the upper third of the thigh, where it passes on the inner side of the sartorius muscle. Some surgeons apply a double ligature on the vessel, and cut between them. This was the practice of CELSUS for suppressing hæmorrhage from a wound,\* of ÆTIUS

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\* The description of this operation in CELSUS, is a fine specimen of the elegant and comprehensive brevity for which his writings are distinguished: *Quod si illa quoque, (quæ sanguinem supprimunt) profluvio vincuntur, venæ quæ sanguinem fundunt apprehendendæ, circaque id quod ictum est, duobus locis deligandæ intercidendæque sunt, ut et in se ipsæ coeant, et nihilominus ora præclusa habeant.* Lib. V. xxvi. 21.



in aneurism, and of Mr. ABERNETHY, in his earlier operations for the same disease. SCARPA strongly opposes it, and the single ligature is now generally preferred.

The operation for the cure of aneurism is sometimes unsuccessful, from the occurrence of secondary hæmorrhage. This arises from the artery being too much insulated from its surrounding cellular substance, by which the due supply of life and nourishment not being conveyed to the vessel, instead of the adhesive inflammation taking place, there happens an ulceration or sloughing, and consequent bleeding. Secondary hæmorrhage may also happen, when the artery is diseased at or near the place where it is tied; occasionally, it is owing to the slipping off of the ligature.

Another cause of failure, is the occurrence of gangrene, arising from the collateral arteries not having dilated sufficiently, to carry on the circulation independent of the principal trunk. Two cases, in proof of this, are related by Mr. WISHART, in the Appendix to his Translation of SCARPA on Aneurism, page 519. The same gentleman relates the singular circumstance of a popliteal aneurism recurring after the femoral artery had been tied. It occur-

red about nine months after the operation, and was probably owing to the enlargement of the vessels given off above the seat of the operation. Strong compression effected a second, and as yet permanent cure.

The confidence of surgeons increasing by the numerous instances of success which have followed the Hunterian operation, it was natural to extend it to aneurisms situated very high in the thigh; and, in several cases, even the iliac artery has been tied with the happiest result. Operations have been successfully performed on the humeral, the axillary, and the subclavian arteries; but as in giving an account of these, I could only transcribe from others, I shall content myself with referring to works where such operations are detailed by their authors.\*

The importance of the brain in the animal economy naturally led to the opinion, that any injury done to the carotid artery, which

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\* Abernethy's Works. Freer on Aneurism. Hodgson on Diseases of the Arteries and Veins. Wishart's Translation of Scarpa on Aneurism, 2d Edit. Dr. Colles' Edin. Med. and Surg. Journal, Jan. 1816. Mr. Liston's Cases, Edin. Journal, Jan. 1820. Medico-Chirurgical Transactions, *passim*.



conveys so great a portion of its blood, must be attended with injurious effects. The very name carotid is derived from the  $\kappa\acute{\alpha}\rho\omicron\varsigma$ , or stupor, supposed to be induced on animals in whom that vessel was tied. WILLIS, however, had met with a case, in which the right carotid artery was obliterated without any bad consequence, and in which the basilar arteries were much enlarged. PETIT mentions a case of aneurism at the bifurcation of the right carotid, which underwent a spontaneous cure by the obliteration of that artery; and he adds, *je ne connois aucun fait semblable à celui-là*. Still such instances could hardly be deemed sufficient encouragement to tie the carotids, as the gradual accommodation of the collateral vessels, in a long course of time, is very different from the instantaneous stoppage of so large a portion of the vital fluid. It has now, however, been ascertained by many trials, that the operation may be performed with the greatest safety; and that the same happy effects result in aneurisms of the carotid or its branches as in other parts of the body; that the brain and other parts receive their due supply of blood, and that the aneurismal tumour disappears by absorption.

A case occurred to me, in which I found it necessary to tie the left carotid artery, and in which I attended particularly to the effects of the operation on the functions of the brain. The subject of this case was the Gunner of the Coldstream East Indiaman, who being in Calcutta on the 11th of December 1812, fell among some glass-ware, and received two wounds, one about the middle of the masseter muscle of the left side, which was slight; the other was about an inch long, and three-eighths of an inch deep, in a longitudinal direction between the mastoid process, and the articulation of the jaw on the same side. In this last, an artery of considerable size was wounded, and bled profusely. As the accident happened on shore late at night, I had not by me the proper materials for securing the artery; but manual compression of the carotid commanded the flow of blood, and as there was no hæmorrhage by the morning, I brought the edges of the wound together by suture. Both wounds appeared to do well; till on the 28th December, seventeen days after the accident, when the patient was laughing, hæmorrhage returned at one in the afternoon; again, at six in the evening, and at one next



morning. It was always stopped by compression. It again took place on the evening of the 31st, when much stronger compression was applied, about an inch below the wound, and the bleeding stopped for the present. On removing the compress a few days afterwards, I found a small aneurismal tumour close to the edge of the wound. In five days more, this tumour appeared very near bursting; on puncturing it, florid blood immediately issued *per saltum*; on which I enlarged the original wound, applied a ligature, and thought I had secured the wounded vessel. Some nights afterwards, bleeding again took place.

It was not without considerable anxiety, that I now contemplated the probability of being ultimately compelled to put a ligature on the carotid artery. Being now at sea, with no ship in company, my professional assistance was very scanty; and though I had heard of the operation being successfully performed, the books which I happened to have with me contained only the earlier and unsuccessful attempts. I made another effort to secure the injured artery by making a considerable enlargement of the wound, but with so little success, that I suspected I had wounded the



carotid artery near the foramen carotideum. As he was losing blood very fast, I determined to take up the trunk of the vessel at the lower part of the neck; having made preparations in case I should at last find this necessary. Having taken care to make a large external incision, I found no difficulty in laying bare and insulating the artery, using for this purpose the common dissecting forceps and a scalpel, precisely as in dissecting on the dead subject. I placed two ligatures of waxed thread an inch distant from each other, intending to cut between them; but fearing I had not drawn tight enough the one next the heart, I put another close to it, and then introducing a grooved director transversely under the vessel, I divided it with a bistoury. No untoward accident happened. From the appearance of dark venous blood, I thought I might have hurt the jugular vein; but if so, it was so near the conclusion of the operation, that it gave no sort of trouble. I brought the lips of the wound together by three stitches. Two hours after the operation, the pulse was 96: in the evening it was 120, and sharp; the skin hot and dry. Next day, the patient complained of headach across the fore-



head; the pulse was moderate: at night, it again rose to 120, with the skin still hot and dry. On the third day he had headach, but not severe or constant: in the evening smart febrile symptoms occurred; much thirst, heat and dryness of skin, great restlessness. I gave him some of the aqua acetitis ammoniæ in water; and, about one in the morning, the severity of the symptoms abated, the pulse became quite moderate, and a gentle perspiration came out over the whole body. Next morning he had great drowsiness, but no delirium, pulse then 84, and feeble; surface disposed to be cold. On the fifth day, he was very languid and drowsy, and the right side of the body was more feeble than the left: in the evening he had slight delirium. Sixth day, the numbness and feebleness of the right arm was less, but that of the inferior extremity the same. Seventh day, the whole of the right side was better: much discharge of good pus from the wound. Tenth day, complained of pain about the temporal muscle when eating: the ligatures quite firm: some pain apparently in the course of the subclavian artery. Thirteenth day, still much pain round the zygoma; ligatures firm, and keeping up a con-



siderable discharge. Eighteenth day, the ligatures next the heart came away with but little force; but he complained for a few minutes of much pain in the chest. Any attempt to move the other ligature excited great pain; it came away on the twenty-first day. A month after the operation, the original wounds were healed, and the tumour had disappeared: and at the end of five weeks, though there was a fungous growth rising between the sides of the wound, and requiring to be kept down by caustic, the general health of the man was good, and he returned to duty.

THE END.



